

**3M ESPE**

**Pentamix<sup>TM</sup> 3**

**Automatic Mixing Unit**

Operating Instructions

01/06  
3M ESPE AG  
Dental Products



Made in Germany by  
**3M ESPE AG**  
Dental Products  
D-82229 Seefeld - Germany

**3M ESPE**  
Dental Products  
St. Paul, MN 55144-1000

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## ENGLISH

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Automatic Mixing Unit  
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# Table of Contents

	Page
1. Safety Instructions	3
2. Description of the Product	4
3. Technical Data	4
4. Installation	5
5. Functioning	5
5.1 Loading the Cartridge	5
5.2 Inserting the Cartridge	6
5.2.1 Inserting a Pentamix 3 Cartridge	6
5.2.2 Inserting a Pentamix 2 Cartridge	7
5.3 Attaching the Mixing Tip	7
5.3.1 Attaching the Mixing Tip on a Pentamix 3 Cartridge	7
5.3.2 Attaching the Mixing Tip on a Pentamix 2 Cartridge	8
5.4 Starting a New Cartridge	8
5.5 Loading the Impression Tray and Penta Elastomer Syringe	9
5.6 Re-starting a Partly Empty Cartridge	10
5.7 Exchanging a Cartridge	10
5.8 Disposal of Used-up Materials	10
6. Failures and Error Messages	10
7. Maintenance and Care	12
7.1 Exchanging the plunger discs	12
7.2 Care	12
7.3 Maintenance and Repair	12
8. Storing/Transport	12
9. Customer Information	12
9.1 Warranty	13
9.2 Limitation of Liability	13

# 1. Safety Instructions

ATTENTION! Read these instructions carefully before plugging in and operating the unit! As with all units, for safe operation, both the standard safety instructions and the special safety instructions in this operating manual must be carefully followed to ensure correct functioning and safety while operating.

**3M ESPE guarantees for trouble-free operation of the Pentamix system only if 3M ESPE system components are used exclusively.**

1. The unit must only be used in strict accordance with the following instructions. We have no liability for any damage arising from any other or improper use of this unit.
2. A dangerous condition can result from condensation build-up. Before using the unit, allow the unit to reach room temperature, particularly when moving it from a colder to a warmer environment.
3. The power plug must be connected into a suitably grounded socket. If using an extension cable, make sure that the ground line is not interrupted.
4. Position the device so that the power plug is accessible at all times.
5. The unit must be securely placed either on a flat non-skid surface or mounted to a stable, re-enforced wall.
6. Use only Penta™ materials in poly bags in combination with the Penta™ cartridges and Penta™ mixing tips, manufactured by 3M ESPE.
7. Close the cover of the unit before operating.
8. Do not lock the start button. Continuous operation is hazardous.
9. Always turn off the unit and disconnect the plug from the power source before changing the plunger discs.
10. When changing the plunger discs, you must position the smooth side of the new discs to coincide with the poly bag surface (the opposite side of the discs with a fan-shaped design should face toward the plunger rods). Otherwise the poly bag might be damaged.
11. In order to avoid any electrical shock, do not insert any objects into the unit.
12. Use only genuine 3M ESPE parts when replacing defective components as directed in these operating instructions. We have no liability for any damage caused by the use of non-3M ESPE parts or failure to fully comply with these operation instructions.
13. If, for any reason, it is possible that the safety of a unit has been compromised, that unit must be removed from operation and identified in such a way that it is not inadvertently operated again by a third party. For example, do not use unit if it does not work as specified or is visibly damaged.
14. Keep solvents, inflammable liquids and powerful heat sources away from the unit as these may damage the plastic housing.
15. Do not allow cleansers to get into the unit during cleaning; an electrical short or a dangerous malfunction may occur.
16. Only a properly trained, authorized technician should open the unit housing and repair the unit.

## 2. Description of the Product

Pentamix™ 3, manufactured by 3M ESPE, is an automatic mixing unit for processing of Penta™ impression materials. Penta impression materials, manufactured by 3M ESPE, were specifically designed for this device and are supplied in specialized poly bags. Only this form of packaging permits the use in the Pentamix device. Each Penta™ poly bag is sealed with a **PentaMatic** sealing cap. The external geometry of the sealing cap ensures proper positioning on the cartridge. After the Pentamix device is started up, a special internal device opens the poly bag once sufficient pressure is established by the plunger. The connection pieces located on the **PentaMatic** sealing caps serve for proper attachment of the mixing tip.

The cartridges, labeled like the product, and the **PentaMatic** sealing caps are the components of a mechanically sound unit for processing of pastes in the Pentamix device that allows a change of products without intermediate cleaning of the device and no loss of paste.

The Pentamix 3 unit is compatible with all Penta cartridges and Penta mixing tips. Steel-reinforced Penta cartridges (recognizable by the metal ring) and red Penta mixing tips are required to utilize the performance capability of the Pentamix 3 unit (e.g., maximum mixing speed) to the full. When cartridges made completely of plastic and materials which do not satisfy requirements are used, the unit automatically adjusts the mixing speed as a precaution or issues an error message (see Failures and Error Messages).

The Pentamix is supplied as a table-top unit, but can be converted into a wall unit with the commercially available wall mounting brackets.

## 3. Technical Data

Operating mode:	Short term operation - max. 1.5 min. on, min. 10 min. off
Cartridges:	Containers for Penta poly bags Dimensions: 60 x 130 mm, 26.8 x 130 mm
Housing:	All parts of the housing are made of impact-resistant plastic
Power supply:	100 V -240 V
Frequency:	47 Hz-63 Hz
Power input:	max. 2 A
Ambient temperatures:	18°C/64°F.....40°C/104°F
Rel. humidity of air:	20%.....80%
Classification:	Hazard class I
Dimensions:	L 290 mm x W 230 mm x H 290 mm
Weight:	9.8 kg

## 4. Installation

In order to work with the unit, the power plug must be connected into a suitably grounded socket. In case of using an extension cable make sure that the ground line is not interrupted.

- To install the power plug, use the hand wheel to retract the mixing shaft and tip the unit forward. Open the cover on the back of the housing by pressing the lever in the direction of the arrow. Thread the power cord through the opening in the cover and connect it to the unit's power input. Replace the cover on the back of the unit and draw the power cord through the cable channel either toward the rear or to the side.
- Connect the Pentamix 3 unit to the power supply and switch on the unit with the power switch on the right side of the device.
- Pentamix 3 can be placed on any flat surface being supplied as unskidding. Connect the power plug to the power supply and turn on the unit at the power plug. After blinking twice, the operating LED indicates the unit is ready for operation by burning steadily.
- Pentamix 3 can also be mounted to a suitable wall. A special wall fixture is available in commerce.

## 5. Functioning Figures a - I inside of front cover!

### 5.1 Loading the Cartridge

Please carry out the procedures in the following sequence!

- Have ready one poly bag of base paste and one of catalyst paste as well as a cartridge of a 3M ESPE Penta impression material.
- Insert the poly bags from the front into the cartridge (Fig. a).



Fig. a

- The locating lugs make sure for correct position (Fig. b).

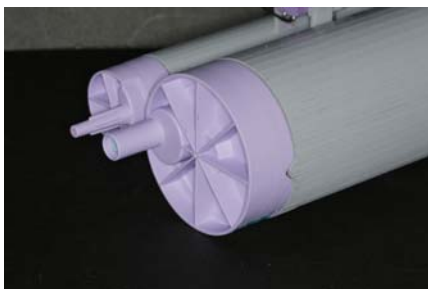


Fig. b

- Lock the lever for the mixing tip (Fig. c).

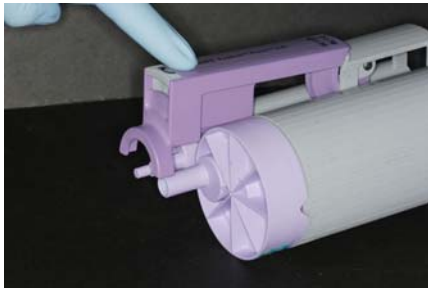


Fig. c

## 5.2 Inserting the Cartridge

The Pentamix 3 unit works with both Pentamix 3 cartridges (recognizable by the locking handle) and the older Pentamix 2 cartridges (recognizable by the handle on the side).

### 5.2.1 Inserting a Pentamix 3 Cartridge

- Open the access door of the unit (Fig. d).



Fig. d

- Use the hand wheel to retract the plungers until they stop. The plungers now are in uppermost position (Fig. e).



Fig. e

- Hold the cartridge by the locking handle and insert it into the unit parallel to the unit opening (Fig. f).



Fig. f

- Use the hand wheel to move the plungers forward until the plungers markedly touch the poly bags (Fig. g).

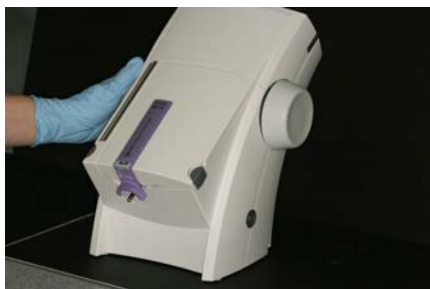


Fig. g

The mixing process cannot be started until the plungers touch the poly bags.

- Attach a mixing tip prior to begin mixing (refer to next section).

### 5.2.2 Inserting a Pentamix 2 Cartridge

- Open the access door of the unit (Figure).
- Use the hand wheel to retract the plungers until they stop. The plungers now are in uppermost position (Figure).
- Insert the cartridge into the unit parallel to the unit opening (Figure).
- Use the hand wheel to move the plungers forward until the plungers markedly touch the poly bags (Figure).

The mixing process cannot be started until the plungers touch the poly bags.

- Attach a mixing tip prior to begin mixing (refer to next section).

To remove it from the unit, lift the Pentamix 2 cartridge from below by the cartridge handle with one finger.

## 5.3 Attaching the Mixing Tip. Always attach a mixing tip before use!

Poly bags equipped with a **PentaMatic** sealing cap exclusively must be used with Penta mixing tips.

### 5.3.1 Attaching the Mixing Tip on a Pentamix 3 Cartridge

- Release the lock by lifting the locking lever (Fig. h) and flip it up (Fig. i).



Fig. h



Fig. i

- First place the mixing tips only on the mixing shaft (Fig. j). Turn slightly to align the openings of the mixing tips with the corresponding outflow openings on the cartridges (Fig. k). Attach the mixing tips. Press again to insure that the mixing tips are seated tightly on the outlet openings (Fig. l).

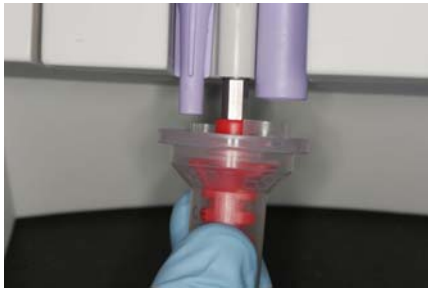


Fig. j

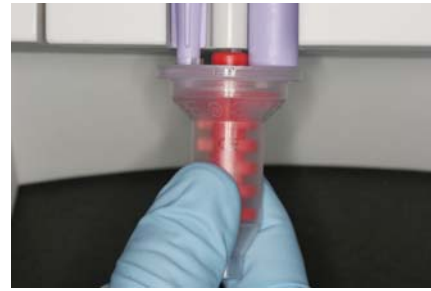


Fig. k

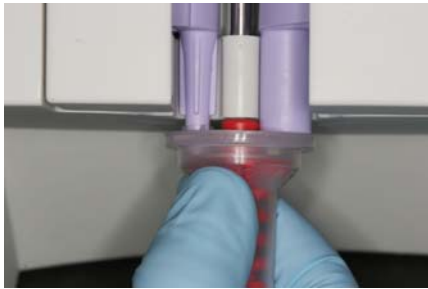


Fig. l

- Press the locking handle down until it audibly clicks into place (Fig. m).



Fig. m

### 5.3.2 Attaching the Mixing Tip on a Pentamix 2 Cartridge

- Open the access door of the unit.
- Release the locking lever.
- First place the mixing tips only on the mixing shaft (Fig. j). Turn slightly to align the openings of the mixing tips with the corresponding outflow openings on the cartridges (Fig. k). Attach the mixing tips. Press again to insure that the mixing tips are seated tightly on the outlet openings (Fig. l).
- Press the locking lever down until it audibly clicks into place.
- Close the access door of the unit.

### 5.4 Starting a New Cartridge

When starting a new pair of poly bags, first of all the pressure in the cartridge has to build up evenly.

**Both poly bags open automatically after some 5-15 seconds due to the pressure exerted by the plunger. This event is easy to hear. Catalyst and base paste bags may not open at exactly the same time.**



Once the bags are open, one paste may flow out before the other paste producing an uneven mixing ratio. For this reason, always make sure to check whether both pastes flow into the mixer and **do not apply the paste until the mixture shows a homogeneous color** (Fig. n).



Fig. n

After mixing the mixing tip remains on the cartridge as a seal!

### 5.5 Loading the Impression Tray and Penta Elastomer Syringe

- ▶ Press the “start” button. Please note: A few seconds pass before the paste becomes visible in the mixing tip.

The unit only functions as long as the “start” button is pressed.

The brief continued running of the unit which is audible is due to technical reasons and relieves the pressure on the poly bags, keeping the paste extrusion after stoppage to a minimum.

Do not arrest the “start” button in order to avoid dangerous situations and continuous working. For safety reasons, use the unit only with closed access door.

- ▶ Tilt the tray to load it. Fill the tray bottom continually from one end to the other, keeping the opening of the mixing tip immersed in the impression material (Fig. o + p). If necessary, smooth the impression material with a spatula.



Fig. o



Fig. p

- ▶ A mixing tip may only be used as long as the mixing shaft inside the mixer rotates smoothly. If the mixing procedure is interrupted for more than 30 sec, the material inside the mixing tip begins to harden and a new mixing tip must be assembled (refer to 5.3 “Attaching the Mixing Tip”). If the mixer is operated while containing hardened material, the catalyst nipple of the sealing cap can be damaged or may break away.
- ▶ Put the Penta Elastomer Syringe, manufactured by 3M ESPE, (after removing the plunger) with its rear opening directly onto the mixing tip and press the “start” button (Fig. q).



Fig. q

**CAUTION:** Not all Penta impression materials can be syringed. Please refer to the instructions for use of the respective product.

## 5.6 Re-starting a Partly Empty Cartridge

After prolonged storing (especially silicones) clean the openings of the cartridge caps from possible plugs using an instrument.

If necessary, start the unit without the mixer in order to control the flow of the paste. Attach a new mixing tip and start the mixing process.

The filling level indicator allows control of the filling quantity. The unit turns off automatically once it is completely empty:

## 5.7 Exchanging a Cartridge

If a cartridge is nearly empty, it is recommended to have a second cartridge at hand, ready for use, to be able to exchange quickly. This cartridge should be prepared as under 5.4 "Starting a New Cartridge".

Utilization capacity time of the mixing tip: refer to 5.5.

## 5.8 Deposal of Used-up Materials

Dispose of used mixing tips and emptied poly bags together with residual garbage.

# 6. Failures and Error Messages

Failure	Cause	Remedy
The unit will not run.	Poly bags empty.	Insert new poly bags in the cartridge.
	Plungers are not in starting position.	Use the hand wheel to move the plungers up against the poly bags.
The unit runs but does not extrude impression material.	Material has set in the mixing tip.	Attach a new mixing tip.
	The plungers are jammed.	Check freedom of movement by turning the hand wheel backwards.
The paste flows too slowly or not at all.	The pastes are too cold, or sealing cap of the base paste is defective.	Allow the pastes to attain room temperature (at least 18°C/65°F). Replace defective poly bag.

Impression material is extruded but the rotor in the tip does not rotate.	The drive shaft has not engaged the mixing tip, it is stuck in its top position.	Remove the mixing tip. Turn the plungers several times up to their upper limit thus regaining axial mobility. Attach new mixing tip.
The cartridge will not fit into the unit.	Plungers are not in the uppermost position.	Use the hand wheel to move the plungers up until they stop and hold. Check the plunger discs for damage.
	The cartridge receptacle is dirty.	Clean the cartridge receptacle.
The unit does not switch off.	The "start" button is stuck.	Press the "start" button again or unplug the unit and free the "start" button.
The plungers are difficult to retract.	Poly bag is wedged between the cartridge and the plunger.	Retract plunger against the resistance, replace defective plunger discs.
Plungers are blocked.	Poly bag not yet relieved.	Start up the unit briefly (1 sec.) to relieve the poly bags.

Failure	Cause	Remedy
Operating LED does not light up.	No power to the unit.	Check the power plug at the unit and the outlet to make sure it has been firmly connected.
Operating LED blinks continually.	Unit electronics defective.	Please contact our Service Center.
Single audio signal when start button is pushed.	Plungers are not in starting position.	Use the hand wheel to move the plungers up against the poly bags.
	Mixing shaft is not seated correctly.	Check and adjust seating of the mixing shaft and mixing tips.
Single audio signal during mixing.	Poly bags empty.	Insert new poly bags in the cartridge.
Double audio signal when start button is pushed.	Cartridge is not correct for the inserted poly bags.	Certain Penta impression materials require steel-reinforced cartridges (e.g., Express™ Penta™ Putty). Replace cartridge.
Five-time audio signal when start button is pushed.	The material is possible defective.	Please contact our Service Center.

## 7. Maintenance and Care

### 7.1 Exchanging the plunger discs

Always turn off the unit and disconnect the plug from the power source before changing the plunger discs. Only original parts may be used as replacements to insure safe operation.

- If damaged, the plunger discs must be replaced. To exchange, unscrew the screw in the centre of the plunger disc. Remove the disc and screw a new one into place (Fig. I).

When changing the plunger discs, you must position the smooth side of the new discs to coincide with the poly bag surface. The opposite side of the discs with a fan-shaped design should face toward the plunger rods; otherwise, the poly bags might be damaged.

### 7.2 Care

- Clean all components with a soft cloth and, if necessary, a mild detergent. For disinfection use commonly available disinfection sprays. Under no circumstances use solvents or scouring agents as they will permanently damage the plastic. Do not allow detergent or water to enter the mixing unit. The following agents can be used for disinfection: Pursept-A (Merz) and FD 322 (Dürr). Pursept-A and FD 322 are not available in all countries.

### 7.3 Maintenance and Repair

- No components inside the unit require servicing or repairing by the user. 3M ESPE will only take the responsibility for the safety, reliability and correct functioning of the mixer if:
  - Any modifications or repairs have only been carried out by personnel authorized to do so by 3M ESPE;
  - The electrical installation complies with all regulatory requirements;
  - The mixer is operated according to these instructions;
- The plastic cartridges are, dependent on the frequency of being used, wearing parts and thus are not covered by the guarantee for this unit. They should be regularly checked as regards signs of wear and tear (e.g., fissures) and replaced with new ones two years after initial operation at the very latest. The use of worn or defective cartridges can have adverse effects on the mixing proportions, reducing the quality of the impression.

## 8. Storing/Transport

Store/transport at -20°C up to 60°C/-4°F up to 140°F.

Maximal rel. humidity of air: 80%.

## 9. Customer Information

No person is authorized to provide any information that deviates from the information provided in this instruction sheet.

## **9.1 Warranty**

3M ESPE warrants this product will be free from defects in material and manufacture. 3M ESPE MAKES NO OTHER WARRANTIES INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. User is responsible for determining the suitability of the product for user's application. If this product is defective within the warranty period, your exclusive remedy and 3M ESPE's sole obligation shall be repair or replacement of the 3M ESPE product.

## **9.2 Limitation of Liability**

Except where prohibited by law, 3M ESPE will not be liable for any loss or damage arising from this product, whether direct, indirect, special, incidental or consequential, regardless of the theory asserted, including warranty, contract, negligence or strict liability.

Information valid as of January 2006